New Technology for Gas Absorption

Completed Technology Project (2012 - 2016)

Project Introduction

The proposed research aims to develop technologies to make gas absorption systems for carbon dioxide or other waste gases smaller and more lightweight through a novel gas-liquid contact mechanism. Furthermore, this technology would permit use of liquid solvents in microgravity where previously only solids were permissible. The overall goal of this proposal is understand the transport mechanics for these waste gases into and within nanometer-sized droplets. Once transport mechanics are characterized, a prototype device may be designed and tested using flight-like conditions. Finally, a full size system will be constructed and tested to ensure scale-up is performed adequately. The full size system will be capable of reduced gravity testing. Carbon dioxide capture is of particular interest to NASA since it is the primary waste gas of human metabolism and must be controlled within any closed environment (spacecraft, spacesuit, etc.). As space vehicles have strict requirements for weight, power, pressure drop, and volume, this research aims to transform the current state-of-the-art through dramatically reducing these requirements. Moreover, cabin atmosphere (oxygen and nitrogen) waste is almost entirely eliminated even when rejecting carbon dioxide to vacuum. These goals are outlined in NASA's Human Health, Life Support and Habitation Systems Roadmap.

Anticipated Benefits

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Project Image New Technology for Gas Absorption

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Space Technology Research Grants

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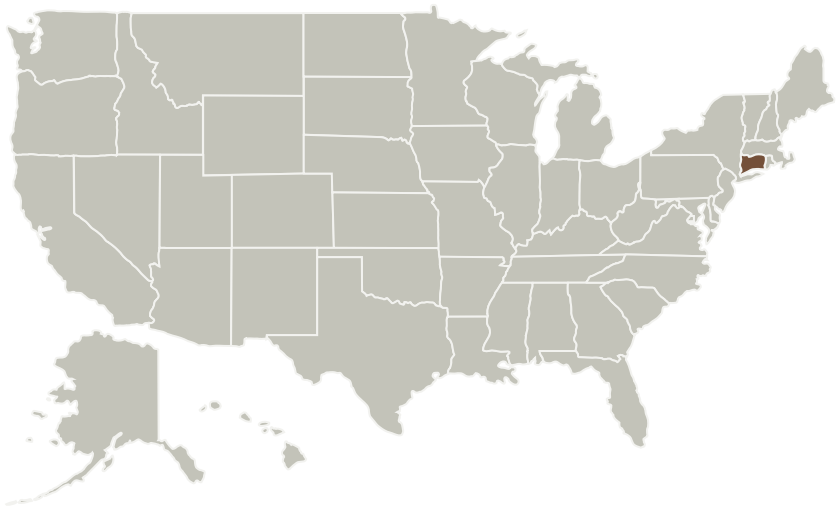
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Yale University	Supporting Organization	Academia	New Haven, Connecticut

Primary U.S. Work Locations
Connecticut

Project Management

Program Director:
Claudia M Meyer

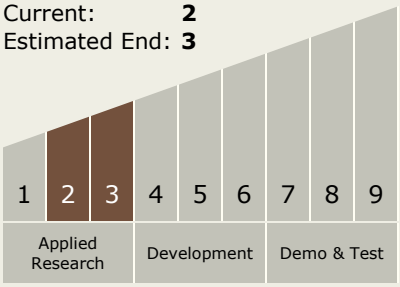
Program Manager:
Hung D Nguyen

Principal Investigator:
Juan De La Mora

Co-Investigator:
Matthew Paragano

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.1 Atmosphere Revitalization

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Images

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Project Image New Technology for Gas Absorption
(https://techport.nasa.gov/image/1805)

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html